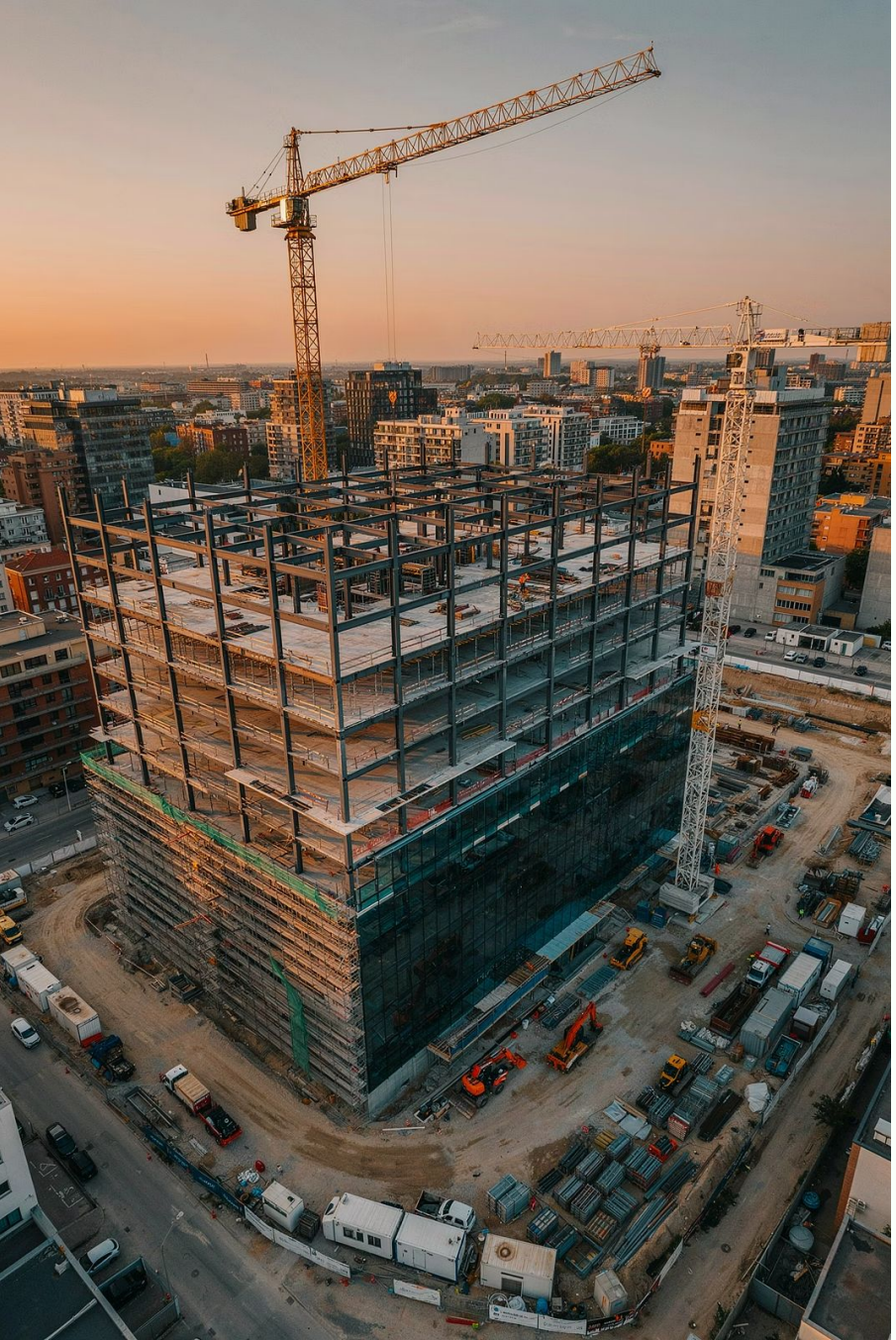


How BIM Saves Millions During Pre-Construction

Re**al project examples demonstrating how Building Information Modeling transforms cost control**, coordination, and delivery – before a single shovel breaks ground.

The Traditional Problem: Rework and Risk

Unforeseen Site Conflicts

2D drawings fail to capture the full spatial complexity of a building, leaving critical system conflicts hidden until construction begins.

Fragmented Communication

Sequential coordination between disciplines creates information silos, causing delays and misalignment across teams.

Costly Late-Stage Clashes

Discovering conflicts on-site – not in design – is exponentially more expensive and triggers cascading schedule impacts.

CHAPTER 1

The Power of 3D Coordination

Virtual modeling allows all project teams to identify and resolve conflicts **before breaking ground** – not during costly construction phases.

Conflict Visibility

Systems like plumbing and HVAC are spatially mapped, surfacing intersections invisible in 2D.

Design-Phase Fixes

Engineering changes made in the model cost a fraction of field corrections – eliminating rework before it starts.

The CLSB Success: $10 Million Saved

$295M

Project Budget

Collaborative Life Sciences Building, one of the most complex academic medical facilities ever built

28

Design Teams

Engineering and design disciplines coordinated through a single all-digital process

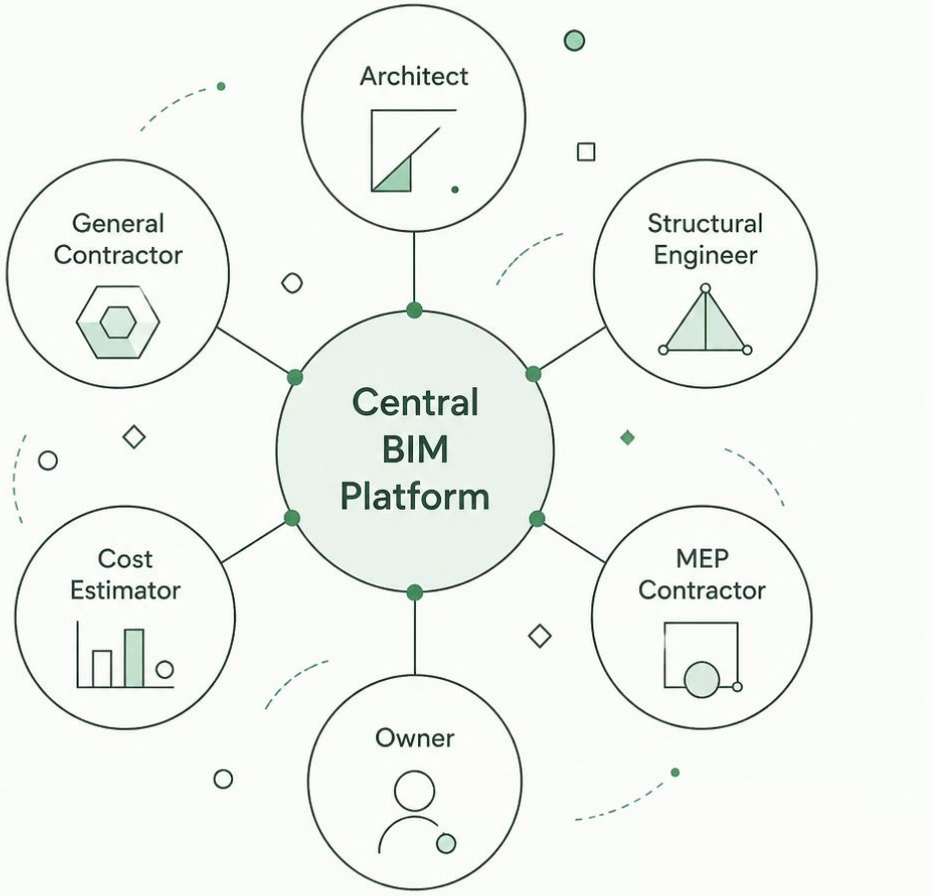
127K

Hours Saved

Manual coordination hours eliminated through digital documentation and clash resolution

CHAPTER 2

Real-Time Collaboration



BIM moves teams beyond static file exchanges into **live, linked cloud environments** where every change is instantly visible to all stakeholders.

- One firm's design update automatically propagates across the entire model
- Version-control errors and duplicated documentation are eliminated at the source
- Owners gain real-time visibility into design decisions and their cost implications

Baystate Medical Center: A 2009 Turning Point

The Challenge

Mid-project, the team made a bold decision: abandon 2D coordination and transition entirely to 3D BIM – while construction was already underway.

The switch paid off immediately. Concurrent trade coordination compressed the schedule by **2-3 full months**.

The Breakthrough

BIM unlocked a capability previously impossible: **off-site prefabrication of complex mechanical risers**. Components were fabricated in a controlled environment and installed with near-zero field modification – a direct result of model-level precision.

Baystate became an early proof point that mid-project BIM adoption delivers measurable ROI.

CHAPTER 3

The 5D BIM Revolution

3D Model

Spatial geometry and clash detection – the foundation of BIM coordination

+ 4D: Time

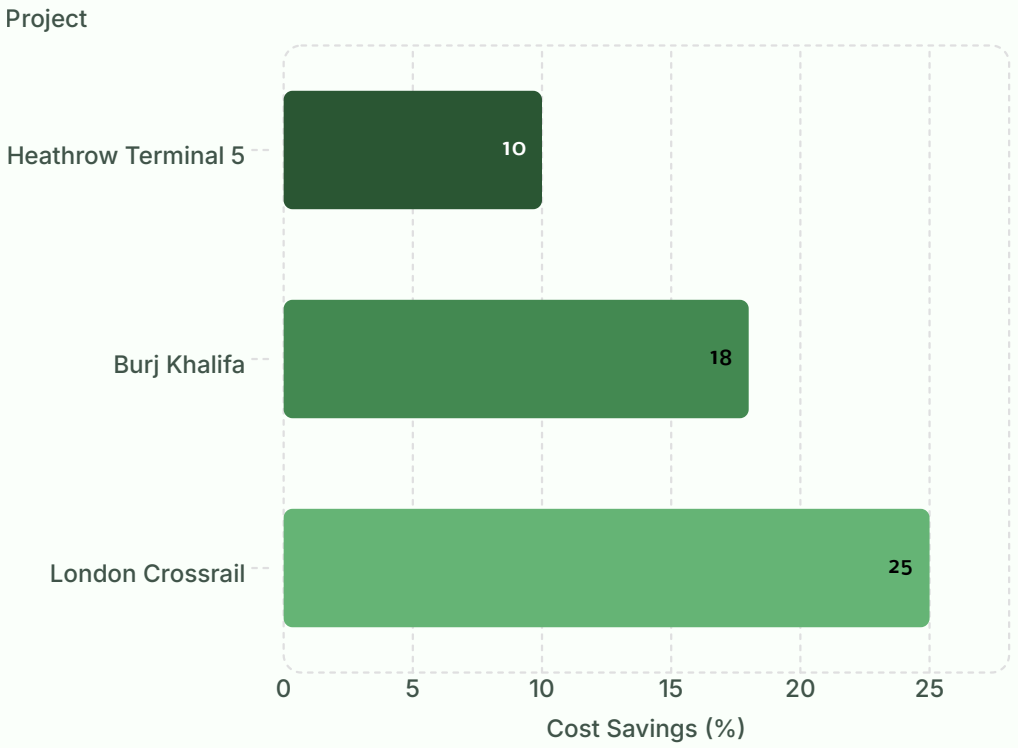
Construction sequencing and schedule simulation linked directly to model elements

+ 5D: Cost

Live cost data embedded in the model – enabling real-time scenario analysis and budget control

Projects like **Heathrow Terminal 5** leveraged 5D BIM to dynamically track costs throughout design, ensuring delivery within one of the most scrutinized budgets in infrastructure history.

The Economics of Precision

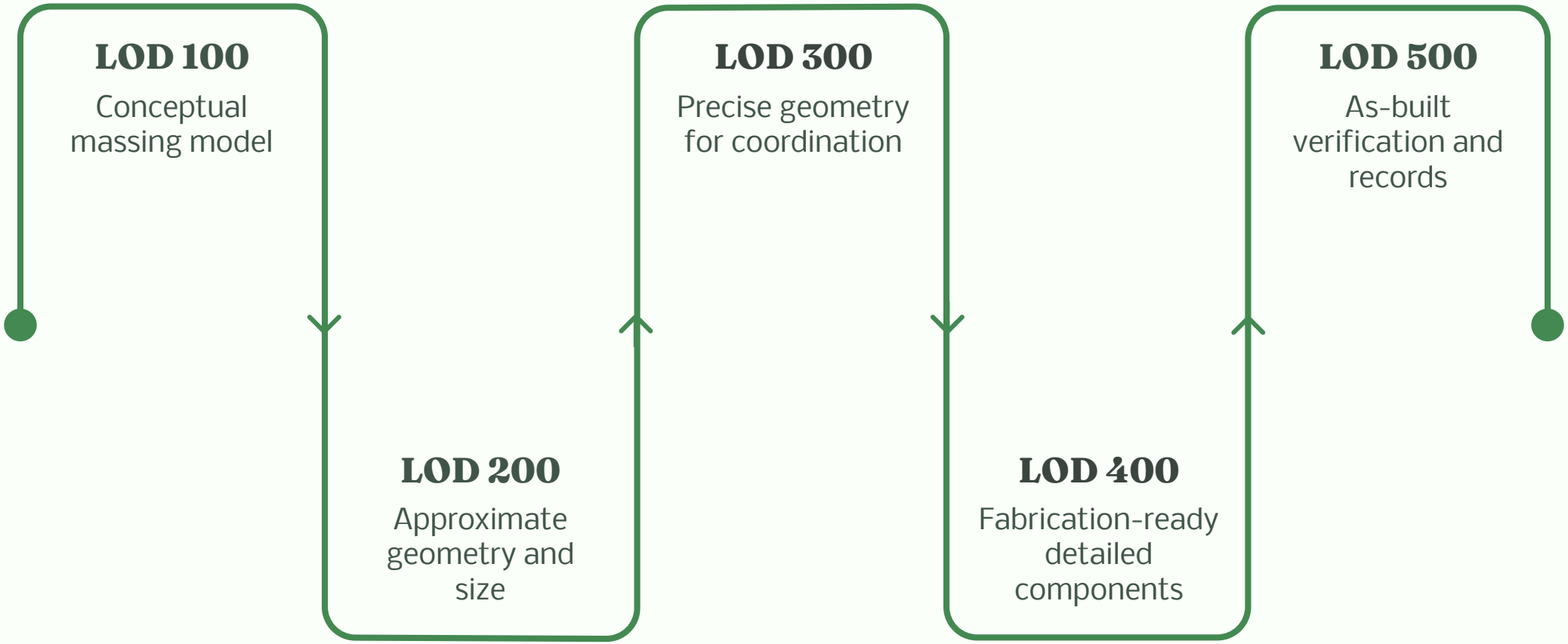


What the Numbers Reveal

Across the world's most complex mega-projects, BIM consistently delivered double-digit cost savings – not through luck, but through **precision coordination and real-time cost intelligence**.

- **Heathrow T5:** 5D integration kept a £4.3B project on budget
- **Burj Khalifa:** BIM optimization reduced costs by 18% on a structurally unprecedented tower
- **London Crossrail:** Detailed structural coordination saved 25% on Europe's largest infrastructure project

Standardizing Success: LOD 100 to 500



Levels of Development (LOD) create a shared language of model reliability. **LOD 300/400 deliver the fabrication-level precision that drives cost certainty,** while LOD 500 provides as-built records that support long-term facility operations and reduce lifecycle costs.

CHAPTER 4

Eliminating Rework in 2026

90% Less Rework

Modern clash detection tools resolve conflicts in the model, slashing on-site corrections by up to 90% compared to traditional workflows.

AI-Powered Prediction

Integrated AI analyzes historical project data to forecast cost overruns and schedule risks before they materialize.

Data-Driven Decisions

Gut-instinct estimation is replaced by model-embedded quantities, live cost feeds, and scenario modeling grounded in real data.

The Human and Environmental Impact

Beyond the Budget Line

BIM's value extends well past cost savings – it fundamentally improves **how projects are built and who benefits**.

🌱 Sustainability

Optimized material takeoffs reduce waste; energy modeling cuts operational carbon footprint from day one.

🦺 Site Safety

Proactive hazard identification in the model reduces crew risk before workers ever set foot on site.

🏗️ Build Quality

A shared 3D vision aligns all trades on constructability, elevating design intent into delivered reality.

The Future is Digital

> Stop paying for mistakes discovered in the field. Start building – and solving – in a virtual environment.

BIM is the Standard

No longer optional – BIM is the baseline expectation for competitive, profitable project delivery worldwide.

Pre-Construction is Where You Win

Every dollar invested in virtual coordination returns multiples during construction – before risk becomes cost.

From Reactive to Proactive

Digital-first teams don't respond to problems – they design them out of existence before ground is ever broken.